



AFCTN Test Report

94-055

AFCTB-ID
93-107



Technical Illustration Transfer

Using:

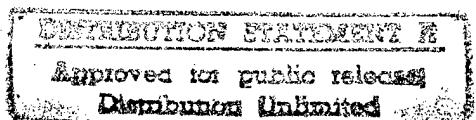
Auto-trol Technology's Data



MIL-D-28000A (IGES)

Quick Short Test Report

03 December 1993



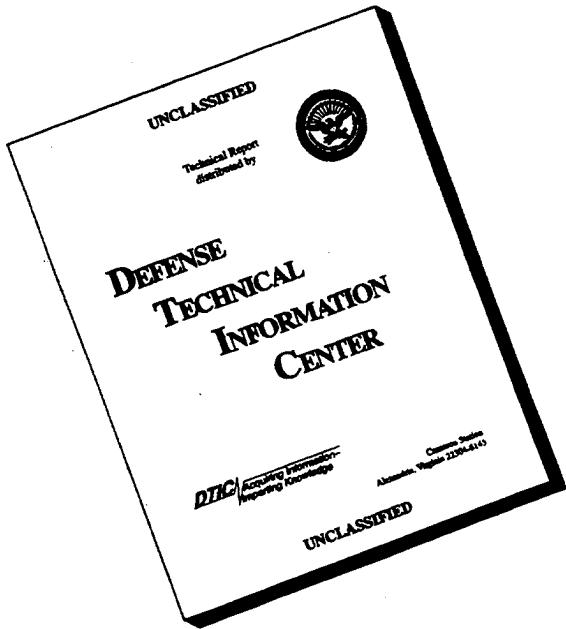
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Prepared for
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19960822 170

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03 December 1993

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1. Introduction

1.1 Background

The Department of Defense (DoD) Air Force Continuous Acquisition and Life-cycle Support (CALS) Test Network (AFCTN) is conducting tests of the military standard for the Automated Interchange of Technical Information, MIL-STD-1840A, and its companion suite of military specifications. The AFCTN is a DoD sponsored confederation of voluntary participants from industry and government managed by the Electronic Systems Center (ESC).

The primary objective of the AFCTN is to evaluate the effectiveness of the CALS standards for technical data interchange and to demonstrate the technical capabilities and operational suitability of those standards. Two general categories of tests are performed to evaluate the standards; formal and informal.

Formal tests are large and comprehensive, which follow a written test plan, require specific authorization from the DoD, and may take months to prepare, execute, and report.

Informal tests are quick and short, used by the AFCTN technical staff, to broaden the testing base. They include representative samples of the many systems and applications used by AFCTN participants. They also allow the AFCTN staff to gain feedback from many industry and government interpretations of the standards, to increase the base of participation in the CALS initiative, and respond to the many requests for help that come from participants. Participants take part voluntarily, benefit by receiving an evaluation of their latest implementation (interpretation) of the standards, interact with the AFCTN technical staff, gain experience using the standards, and develop increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.

1.2 Purpose

The purpose of the informal test, reported in this QSTR, was to analyze Auto-trol Technology's interpretation and use of the CALS standards in transferring technical illustration data. Auto-trol used its CALS Technical Data Interchange System, which consists of Sun Sparcstation/SunOS hardware and Auto-trol Series 5000 v9.1 software, to produce data in accordance with the standards, and delivered it to the AFCTN technical staff using an internet electronic transfer. The stated goal was to evaluate the data and not the MIL-STD-1840A format. No Document Declaration file was delivered with this first test.

2. Test Parameters

Test Plan: AFCTB 93-107

Date of Evaluation: 03 December 1993

Evaluator:
George Elwood
Air Force CALS Test Bed
DET 2 HQ ESC/AV-2P
4027 Colonel Glenn Hwy
Suite 300
Dayton OH 45431-1672

Data Originator:
Rob Larsen
Auto-trol Technology
12500 North Washington Street
Denver CO 80241
(313) 252-2248

Data Description:
Technical Illustration Test
1 Initial Graphics Exchange Specification
(IGES) file

Data Source System:
IGES
HARDWARE
SUN Sparsstation/SunOS
SOFTWARE
Auto-trol S5000 v9.1

Evaluation Tools Used:

MIL-D-28000 (IGES)
Sun SparcStation 2
AUTODESK AutoCAD R12
Carberry CADLeaf Plus v3.1
IGES Data Analysis (IDA) Parser/Verifier v92
IDA IGESView v3.05
International TechneGroup Incorporated
(ITI) IGES/Works v1.3

SGI Indigo2

AUTODESK AutoCAD R12
Cadkey Cadkey v6.0
PC 486/50
AUTODESK AutoCAD 386 R12
AUTODESK AutoCAD 386 R11
Cadkey Cadkey v6.0
IDA IGESView Windows

Standards
Tested: MIL-D-28000A

3. 1840A Analysis

3.1 External Packaging

The file was submitted to the Air Force CALS Test Bed (AFCTB) via an internet electronic transfer. Packaging was not evaluated.

3.2 Transmission Envelope

Per agreement between Auto-trol and the AFCTB, the file was submitted via an electronic transfer instead of a full CALS submission. Hence, the file was not named in accordance with the MIL-STD-1840A requirements.

3.2.1 Tape Formats

Not evaluated.

3.2.2 Declaration and Header Fields

Because the file was submitted via an electronic transfer, instead of as a full CALS submission, declaration and header fields were not addressed or evaluated as part of this test.

4. IGES Analysis

The transfer contained one IGES file. This file was evaluated using IDA's parser/verifier set for CALS Class I. This utility reported that the file meets the specification defined in CALS MIL-D-28000A.

The file was inspected for the CALS conformance statement. The correct statement was found.

The AFCTB has several tools for viewing IGES files. These tools are not used to generate a pass/fail but to report how commercially available software can handle the files. Many

of these products are used in the development of technical publications and are good indicators of usability. The use of these products is not an endorsement nor an indication of CALS capability. All operations were performed using the default settings.

The file was converted using a utility available within the AFCTB, with no reported errors. The resulting file was read into Island Graphics' *IslandDraw*, displayed and printed without a reported error. The hard copy image was the same as the original provided by Auto-trol, with the exception of horizontal line in the fractions. All of these horizontal lines were shown as vertical lines located to the left of the correct location.

The file was read using AUTODESK's AutoCAD R12 with translator version 5.1. Compared with the provided original, the hard copy output had no discrepancies.

The file was converted using another software available within the AFCTB, without a reported error. The resulting file read into yet another software without a reported error. When the hard copy was checked, discrepancies were noted in the "General Note" where the vertical letters touched and were not slanted. The word does have a slant value. In the imbedded font block change the "delta" was not displayed. The horizontal lines in the fraction block were not displayed.

The file was converted using Cadkey's *ig2c* utility. The resulting file was read into Cadkey's *Cadkey*, displayed and printed. Variations were noted in the imbedded font block which did not display any characters except the text.

The file was read into Carberry's *CADLeaf* software without a reported error. Variations were noted in the "General Note" where the vertical text was not slanted, and the word does have a slant value. In the imbedded font block, text was shown throughout, without the special characters.

The file was read using IDA's *IGESView* and *IGESView for Windows*. No discrepancies were noted.

The file was read using ITI's *IGESWorks* without a reported error. The file was displayed and printed. No discrepancies were noted.

The IGES file was converted using a utility available within the AFCTB, without a reported error. The resulting file was read into a software, displayed and printed. The only noted discrepancy was in the "General Note" block where the letter "I" in the vertical text was slanted at a different angle. The word "SIMPLE" is one word and has a slant value.

The IGES file submitted by Auto-trol meets the specification defined in CALS MIL-D-28000A.

5. SGML Analysis

No Standard Generalized Markup Language (SGML) files were included in this test.

6. Raster Analysis

No Raster files were included in this test.

7. CGM Analysis

No Computer Graphics Metafile (CGM) files were included in this test.

8. Conclusions and Recommendations

The stated goal of this evaluation was the IGES file. The submitted file did not have a Document Declaration file nor CALS header on the data file. The file set was not a complete CALS submission.

The IGES file meets the CALS MIL-D-28000A specification.

9. Appendix A - Detailed IGES Analysis

9.1 File IENTITY2

9.1.1 IDA Parser/Verifier Log

```
*****
*****  IGES PARSER/VERIFIER  *****
*****      MARCH 1993      *****
*****  IGES Data Analysis  *****
*****      (708) 344-1815      *****
*****
```

Input file is ientity3.igs

Checking conformance to CALS Class I (MIL-D-28000A 2/10/92)

Today is December 3, 1993 12:31 AM

```
*****
*****      CHECK FILE SYNTAX  *****
*****
```

Section	Records
Start	7
Global	3
Directory	500 (250 Entities)
Parameter	487
Terminate	1

No syntax errors detected.

```
*****
*****      SUMMARY AND STATISTICS  *****
*****
```

*** File and Product Name Information ***

```
File name from sender      = 'ientity'
File creation Date.Time   = '931203.090822'
Model change Date.Time    = ''
Author                     = ''
Department                 = 'AUTO-TROL TECHNOLOGY'
Product name from sender = 'S5000'
```

Destination product name = ''

*** Parameter Delimiters ***

Delimiter = ','
Terminator = ';'

*** Originating System Data ***

System ID = 'AUTO-TROL S5000 V 9.1'
Preprocessor version = 'VERSION 8.0'
Specification version = 6 (IGES 4.0)

*** Precision levels ***

Integer bits = 32
Floating point - Exponent = 23 Mantissa = 8
Double precision - Exponent = 52 Mantissa = 11

*** Global Model Data ***

Model scale = 1.0000E+00
Unit flag = 1
Units = 'INCH'
Line weights = 27
Maximum line thickness = 1.000000E+00
Minimum line thickness = 3.703704E-02
Granularity = 1.000000E-06
Maximum coordinate = 1.650000E+01

Drafting standard applicable to original data is not specified.

*** Status Flag Summary ***

Blank status: Visible	250
Blanked	0
Independence: Independent	248
Physically Subordinate	1
Logically Subordinate	1
Totally Subordinate	0
Entity use: Geometry	152
Annotation	97
Definition	1
Other	0
Logical/Positional	0
2D parametric	0
Construction geometry	0

	Not Specified	0
Hierarchy:	Structure DE applies	0
	Subordinate DE applies	250
	Hierarchy property applies	0
	Not Specified	0

*** Entity Occurrence Counts ***

Entity	Form	Level	Count	Type
-----	-----	-----	-----	-----
106	11	0	67	Copious data - Piecewise planar, linear
string(2D linear path)				
110	0	0	85	Line
212	0	0	83	General note
212	2	0	1	General note - imbedded font change
dimension				
212	3	0	1	General note - superscripted dimension
212	4	0	1	General note - subscripted dimension
212	5	0	1	General note - super-/sub-scripted
dimension				
212	7	0	1	General note - multiple stack/center
justified				
212	100	0	6	General note - simple fractional dimension
212	102	0	1	General note - imbedded font change/double
fractional dimension				
404	0	0	1	Drawing
406	16	0	1	Property - Drawing size
410	0	0	1	View - Orthographic parallel

*** Entity Count by Level ***

Level	Count
0	250

*** Labeling Information ***

100% of the entities are labeled.

Unlabeled	0
-----------	---

Label	Count	Label	Count	Label	Count
VIEW	1	PROPERTY	1	DRAWING	1
LINE	85	LNR PATH	67	NOTE	95

*** Line Fonts Used in Data ***

100 102 104 106 108 110 112 114

-	-	-	-	-	-	-	-	Undefined
-	-	-	67	-	85	-	-	Solid
-	-	-	-	-	-	-	-	Dashed

<<<< PART OF LOG FILE REMOVED HERE >>>>

*** Line Widths Used in Data ***

Weight	Count	Width
Defaulted	250	(0.0370)

*** Colors Used in Data ***

Defaulted 250

***** ENTITY ANALYSIS *****

*** Entity type: 106

*** Entity type: 110

-- 85 lines averaging 2.424544E+00 units --

*** Entity type: 212

132 text strings in data file.
Average text aspect ratio in file is 7.3620707.
Minimum text aspect ratio in file is 0.9373333.
Maximum text aspect ratio in file is 160.0000000.

FONTS USED IN FILE

FONT	COUNT	NAME
1	130	Default ASCII Style
1002	2	Symbol Font 2

*** Entity type: 404

Drawing at D 5 contains 1 views.
Drawing at D 5 contains 0 annotation entities.

*** Entity type: 406

*** Entity type: 410

Scale of view at D 1 is 1.000000E+00.
Orthographic View entity at D 1 has 0 clipping planes specified.
XMIN = Not Set XMAX = Not Set
YMIN = Not Set YMAX = Not Set
ZMIN = Not Set ZMAX = Not Set

*** Message Summary ***

*** Error Summary ***

0 fatal errors 0 severe errors 0 errors 0 warnings 0 cautions 0 nitpicks
0 notes

*** End of Analysis of ientity3.igs ***

9.1.2 AutoCAD R12 Parser Log

Title: IGESIN Journal (v5.1 Nov 05 1992)

File: C:/TMP/IENTITY3.xli

Date: Thu, Dec 02, 1993

Time: 17:31:04

EVALUATION VERSION -- NOT FOR RESALE

Translator S/N: 117-10075750

Translating from IGES file: C:/TMP/IENTITY3.IGS
to AutoCAD Drawing: C:\TMP\ENTITY3.dwg

Options obtained from: C:\ACAD\SUPPORT\CALS1.OPT

Options Description: Configuration file for CALS Class I

Curves Approximated to Tolerance of 0.01

Surfaces Approximated to Tolerance of 0.01

Text Font/Style mapping:

IGES Text font	Style Name	ACAD Font
0	SYMBOL0	iges0
1	STANDARD	txt
2	LEROY	txt
3	FUTURA	txt
6	COMP80	txt
12	GOTHICE	gothice
13	GOTHICI	gothici
14	ROMANS	romans
17	ROMANT	romant
18	ROMAND	romand
19	OCR	txt
1001	SYMBOL1	iges1001
1002	SYMBOL2	iges1002
1003	SYMBOL3	iges1003
2001	KANJI	bigfont

IGES Linefont/AutoCAD Linetype mapping

IGES Line Font AutoCAD linetype Shape file
0 BYLAYER

1	CONTINUOUS	
2	DASHED	acad.lin
3	PHANTOM	acad.lin
4	CENTER	acad.lin
5	DOT	acad.lin

Parse phase

*** Warning (IAFP__LARGER_SGL_SIG) ***
TMP/IENTITY3.IGS, line 11: IGES file has greater number of significant digits
in single precision numbers than this system.

Start Section:

CONFORMANCE: This IGES file conforms to the MIL-D-28000A, 10 Feb 1992
Class I subset (Technical Illustrations).

ILLUSTRATION IDENTIFIER:

A

Global Section:

Parameter Delimiter: ,
Record Delimiter: ;
Sending Product ID: S5000
File Name: ientity
System ID: AUTO-TROL S5000 V 9.1
Preprocessor Version: VERSION 8.0
Size of Integer: 32
Sgl. Precision Mag: 23
Sgl. Precision Sig: 8
Dbl. Precision Mag: 52
Dbl. Precision Sig: 11
Receiving Product ID:
Model Space Scale: 1.000000
Unit Flag: 1
Unit String: INCH
of Line Weights: 27
Maximum Line Width: 1.000000
Creation Date: 12/02/93 08:19:56
Minimum Resolution: 0.000001
Maximum Coordinate: 16.500000
Author:
Organization: AUTO-TROL TECHNOLOGY
IGES Version Number: 6
Drafting Standard: 0

Entity Summary:

Type Count	Form	Description
106	11	Planar Piecewise Linear Curve
67		
110	0	Line
85		
212	0	General Note (Simple)
83		
212	2	General Note (Font change)
1		
212	3	General Note (Superscript)
1		
212	4	General Note (Subscript)
1		
212	5	General Note (Super/subscript)
1		
212	7	General Note (Center justified)
1		
212	100	General Note (Simple fraction)
6		
212	102	General Note (Fnt chg/dbl fract.)
1		
404	0	Drawing (form 0)
1		
406	16	Property (Drawing Size)
1		
410	0	View
1		
Total	250	

Translation phase

Drawing Entity (404 Form 0) at DE 5, with
name = ,
size = 16.500000, 10.500000,
units = IN,
was processed in the AutoCAD drawing file: C:\TMP\ENTITY3.dwg

*** Warning (ACAD_NEW_VIEW_VOLUME_GENERATED) ***
(DE: 1 TF: 410:0)

A new view volume has been generated for the view with:
XMIN (-1.386796), XMAX (18.386796),

YMIN (-1.386796), YMAX (12.386796),
ZMIN (-1.886796), ZMAX (1.886796).

IGES Entity Summary

Type	Form	Description	Count	Processed	Errors
106	11	Planar Piecewise Linear Curve	67	67	0
110	0	Line	85	85	0
212	0	General Note (Simple)	83	83	0
212	2	General Note (Font change)	1	1	0
212	3	General Note (Superscript)	1	1	0
212	4	General Note (Subscript)	1	1	0
212	5	General Note (Super/subscript)	1	1	0
212	7	General Note (Center justified)	1	1	0
212	100	General Note (Simple fraction)	6	6	0
212	102	General Note (Fnt chg/dbl fract.)	1	1	0
404	0	Drawing (form 0)	1	1	0
406	16	Property (Drawing Size)	1	1	0
410	0	View	1	1	0
Totals			250	250	0

AutoCAD Entity Summary

Entity	Created	Errors
LINE	85	0
TEXT	132	0
INSERT	12	0
POLYLINE	67	0
BLOCK	12	0
Totals	308	0

Error Summary:

The following message was issued 1 time(s)
IGES file has greater number of significant digits in single precision
numbers than this system.

The following message was issued 1 time(s)
A new view volume has been generated for the view with:
XMIN (%lf), XMAX (%lf),
YMIN (%lf), YMAX (%lf),
ZMIN (%lf), ZMAX (%lf).

Status: 0
Warning: 2
Error: 0
Fatal: 0

Elapsed Time:

Processor: 00:00:17
Clock: 00:00:17

9.1.3 IGES/Works Parser Log

IGES/Works v1.4.1
International TechneGroup Incorporated
Validation Logfile

Date: December 03, 1993
Model: ientity3_mvd

***** Validation Parameters *****

TOLERANCE CONFIGURATION VALUES

ZERO_TOL	= 1.000000e-13
MODEL_SPACE_PNT_COIN_TOL	= 1.000000e-03
PARM_SPACE_PNT_COIN_TOL	= 1.000000e-08
ISO_PARM_CURVE_TOL	= 1.000000e-08
NON_CONV_TOL	= 1.000000e-12
KNOT_COIN_TOL	= 1.000000e-10
SAME_INTER_TOL	= 1.000000e-12
PARALLEL_LINES_TOL	= 1.000000e-07
ANGLE_COIN_TOL	= 1.000000e-05
PNT_PROJ_TOL	= 1.000000e-07
COLIN_TOL	= 1.000000e-07
COPLANAR_TOL	= 1.000000e-08
ZERO_NORMAL_TOL	= 1.000000e-06
SAME_TANGENT_TOL	= 1.000000e-04
SAME_CURVATURE_TOL	= 1.000000e-04
SAME_DERIVATIVE_TOL	= 1.000000e-03
MODEL_LINEAR_APPROX_TOL	= 2.220446e-16

***** Entity Listing Before Validation *****

Count	Type	Form	Description
-----	---	----	-----
67	106	11	Planar Piecewise Linear Curve
85	110	0	Line
95	212	0	General Note (Simple)

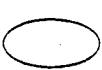
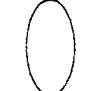
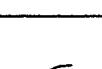
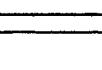
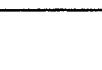
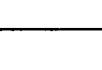
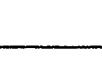
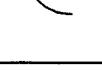
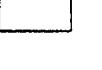
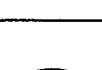
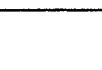
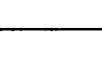
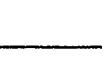
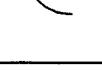
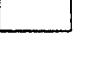
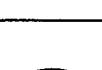
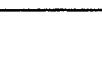
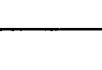
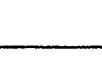
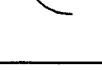
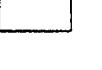
247 - Number of entities in selection list

***** Entity Validation *****

Entity Validation Summary:

Number of	Number of
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Type	Form	Entity Count	Number Valid	Corrected Warnings	Corrected Errors	Uncorrected Warnings	Uncorrected Errors
Global Section		1	1	0	0	0	0
106	11	67	67	0	0	0	0
110	0	85	85	0	0	0	0
212	0	95	95	0	0	0	0
Totals:		248	248	0	0	0	0

						
CIRCULAR ARC (100)	COMPOSITE CURVE (102)	CONIC ARC (GENERAL) (104 F1)	CONIC ARC HYPERBOLA (104 F2)	CONIC ARC PARABOLA (104 F3)	LINEAR PLANAR CURVE (106 F115)	SIMPLE CLOSED AREA (106 F63)
						
LINE (110)	PARAMETRIC SPLINE CURVE (112)	TRANSFORMATION MATRIX (124 F0)	RATIONAL B-SPLINE CURVE (126 F0)	RATIONAL B-SPLINE CURVE RATIONAL ARC (126 F1)	RATIONAL B-SPLINE CURVE RATIONAL ARC (126 F2)	RATIONAL B-SPLINE CURVE RATIONAL B-SPLINE CURVE RATIONAL ARC (126 F3)
						
RATIONAL B-SPLINE CURVE RATIONAL HYPERBOLA (126 F5)	GENERAL MLINE (212 F0)	GENERAL MLINE (212 F1)	GENERAL MLINE (212 F2)	GENERAL MLINE (212 F3)	SUPER/SUB (212 F4)	SUPER/SUB (212 F5)
						
NOTE-MULTI STACK CENTER (212 F7)	NOTE-MULTI STACK RIGHT (212 F8)	NOTE-SIMPLE FRACTION (212 F9)	NOTE-DUAL STACK (212 F10)	NOTE-DUAL STACK (212 F10)	NOTE-FONT/DINOLE FRACTION (212 F10)	NOTE-FONT/DINOLE FRACTION (212 F10)
						
SUM FIGURE- "PERSON"	RECTANGULAR ARRAY	3 X CIRCULAR ARRAY	3 X CIRCULAR ARRAY	3 X CIRCULAR ARRAY	SECTIONED AREA ENTITY (212 F105)	SECTIONED AREA ENTITY (212 F105)
CHARACTER SPACING (406 F18)	CHARACTER SPACING (406 F18)	CHARACTER SPACING (406 F18)	CHARACTER SPACING (406 F18)	CHARACTER SPACING (406 F18)	CHARACTER SPACING (406 F18)	CHARACTER SPACING (406 F18)
SPACING	SPACING	SPACING	SPACING	SPACING	SPACING	SPACING
CALS TEST NETWORK	CALS TEST NETWORK	CALS TEST NETWORK	CALS TEST NETWORK	CALS TEST NETWORK	CALS TEST NETWORK	CALS TEST NETWORK
MIL-D-28000	MIL-D-28000	MIL-D-28000	MIL-D-28000	MIL-D-28000	MIL-D-28000	MIL-D-28000
CLASS 1	CLASS 1	CLASS 1	CLASS 1	CLASS 1	CLASS 1	CLASS 1
REFERENCE DRAWING	REFERENCE DRAWING	REFERENCE DRAWING	REFERENCE DRAWING	REFERENCE DRAWING	REFERENCE DRAWING	REFERENCE DRAWING
I-ENTITY	I-ENTITY	I-ENTITY	I-ENTITY	I-ENTITY	I-ENTITY	I-ENTITY

9.1.4 Output AutoCAD R12

CIRCULAR ARC (100)	COPRODUCT: CURVE (102)	COPRODUCT: CURVE (104 F1)	COPRODUCT: CURVE (104 F1)	COPRODUCT: CURVE (104 F1)	COPRODUCT: CURVE (104 F1)	COPRODUCT: CURVE (104 F1)
LINE (110)	PARAMETRIC SPLINE CURVE (112)	TRANSFORMATION MATRIX (124 F0)	RATIONAL B-SPLINE CURVE (126 F0)	RATIONAL B-SPLINE CURVE (126 F1)	RATIONAL B-SPLINE CURVE (126 F1)	RATIONAL B-SPLINE CURVE (126 F1)
RATIONAL B-SPLINE CURVE (126 F5)	SIMPLE	GENERAL NOTE (212 F0)	GENERAL NOTE (212 F1)	GENERAL NOTE (212 F2)	GENERAL NOTE (212 F3)	GENERAL NOTE (212 F4)
DIAL STACK	DIAL STACK	DIAL STACK				
NOTE: MATTI STACK JUST (212 F7)	NOTE: MATTI STACK JUST (212 F8)	NOTE: MATTI STACK JUST (212 F9)	NOTE: MATTI STACK JUST (212 F10)	NOTE: MATTI STACK FRACTION (212 F10)	NOTE: MATTI STACK FRACTION (212 F10)	NOTE: MATTI STACK FRACTION (212 F10)
REC LAYER - 'PERSIM'	REC LAYER - 'PERSIM'	REC LAYER - 'PERSIM'				
3 X CIRCULAR ARRAY	3 X CIRCULAR ARRAY	3 X CIRCULAR ARRAY				
SIMPLE CLOSER AREA (106 F3)	LINEAR PLANAR CURVE (106 F1)	COPRODUCT: PARABOLA (104 F3)	COPRODUCT: PARABOLA (104 F3)	COPRODUCT: PARABOLA (104 F3)	COPRODUCT: PARABOLA (104 F3)	COPRODUCT: PARABOLA (104 F3)
RATIONAL B-SPLINE CURVE (126 F4)	RATIONAL B-SPLINE CURVE (126 F5)	RATIONAL B-SPLINE CURVE (126 F6)	RATIONAL B-SPLINE CURVE (126 F7)	RATIONAL B-SPLINE CURVE (126 F8)	RATIONAL B-SPLINE CURVE (126 F9)	RATIONAL B-SPLINE CURVE (126 F10)
HATCHED AREA	HATCHED AREA	HATCHED AREA				
M STACK LEFT (212 F1)	M STACK LEFT (212 F1)	M STACK LEFT (212 F1)				
M STACK JUST (212 F1)	M STACK JUST (212 F1)	M STACK JUST (212 F1)				
SUPER SUB	SUPER SUB	SUPER SUB				
SUPER SUBSCRIPT-NONE (212 F5)	SUPER SUBSCRIPT-NONE (212 F5)	SUPER SUBSCRIPT-NONE (212 F5)				
SUPER SUBSCRIPT-NONE (212 F6)	SUPER SUBSCRIPT-NONE (212 F6)	SUPER SUBSCRIPT-NONE (212 F6)				
SUPER SUBSCRIPT-NONE (212 F7)	SUPER SUBSCRIPT-NONE (212 F7)	SUPER SUBSCRIPT-NONE (212 F7)				
SUPER SUBSCRIPT-NONE (212 F8)	SUPER SUBSCRIPT-NONE (212 F8)	SUPER SUBSCRIPT-NONE (212 F8)				
SUPER SUBSCRIPT-NONE (212 F9)	SUPER SUBSCRIPT-NONE (212 F9)	SUPER SUBSCRIPT-NONE (212 F9)				
SUPER SUBSCRIPT-NONE (212 F10)	SUPER SUBSCRIPT-NONE (212 F10)	SUPER SUBSCRIPT-NONE (212 F10)				
SECLUDED AREA ENTITY (212 F05)	SECLUDED AREA ENTITY (212 F05)	SECLUDED AREA ENTITY (212 F05)				
CHARACTER SPACING (408 F10)	CHARACTER SPACING (408 F10)	CHARACTER SPACING (408 F10)				

9.1.5 Output Cadkey v6.0

$\text{IM} \quad \text{DED}$ S SUPER S SUB	<p>NOTE - IMBEDDED FONT -NOTE CHANGE (212 F2)</p> <p>SUPERSCRIPT -NOTE (212 F3)</p>	<p>SUPER</p> <p>SUBSCRIPT -NOTE (212 F4)</p>	<p>T $\frac{\square}{P}$</p> <p>$\frac{\text{BED}}{\text{DED}}$</p> <p>$\frac{\text{FRAC}}{\text{TON}}$</p> <p>$\frac{\text{BOT}}{\text{TON}}$</p> <p>$\frac{\text{SUP}}{\text{SUB}}$</p> <p>$\frac{\text{TT}}{\text{OM}}$</p>	<p>NOTE - SUPER/SUB FRACTION (212 F105)</p> <p>SECTI (</p>
<p>NOTE - DUAL STACK FRACTION (212 F101)</p> <p>(100)</p>	<p>DUAL $\frac{\square}{P}$</p> <p>STACK $\frac{\text{BOT}}{\text{TON}}$</p>	<p>NOTE - FONT/DOUBLE FRACTION (212 F102)</p>	<p>$\frac{\text{BED}}{\text{DED}}$</p>	<p>NOTE - FONT/DOUBLE FRACTION (212 F102)</p>

9.1.6 Output Cadkey v6.0 - Detail

COMPOSITE CURVE 11881 LINEAR ARC 11881							
TRANSPOSITION MATRIX 11881							
SIMPLE NOTE 11881							
H STACK RIGHT 11881							
H STACK CENTER 11881							
H STACK LEFT 11881							
SUPER SUB 11881							
	<img alt="Super/sub 11881						

$\text{IM}^+ \geq \text{DED}$	<p>SUPER</p> <p>IMBEDDED FONT - NOTE CHANGE (212 F2)</p>	<p>SUBSCRIPT-NOTE (212 F3)</p>	<p>SUBSCRIPT-NOTE (212 F4)</p>	<p>TO IM STACK</p> <p>P DED BOT</p> <p>ACT FR TOM</p> <p>SUP SUB</p> <p>TT BO OM</p>	<p>T O P</p> <p>NOTE - FONT/DOUBLE FRACTION (212 F102)</p> <p>NOTE - SUPER/SUB FRACTION (212 F105)</p>	<p>S</p>
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9.1.8 Output Generic - Detail

9.1.9 Output Cadleaf

CIRCULAR ARC (186)	COMPOSITE CURVE (182)	CONIC ARC (GENERAL) (184 F6)	CONIC ARC ELLIPSE (184 F1)	CONIC ARC HYPERBOLA (184 F5)	CONIC ARC PARABOLA (184 F3)	LINEAR PLANAR CURVE (188 F11)	SIMPLE CLOSED AREA (188 F83)
LINE (116)	PARAMETRIC SPLINE CURVE (118)	TRANSFORMATION MATRIX (184 F6)	RATIONAL B-SPLINE CURVE (120 F6)	RATIONAL B-SPLINE CURVE (130 F1)	RATIONAL B-SPLINE CURVE CIRCULAR ARC (186 F2)	RATIONAL B-SPLINE CURVE ELLIPTICAL ARC (186 F3)	RATIONAL B-SPLINE CURVE PARABOLIC ARC (184 F4)
RATIONAL B-SPLINE CURVE HYPERBOLIC ARC (186 F5)	GENERAL NOTE (818 F6)	DUAL STACK - NOTE (818 F1)	IMBEDDED FONT - NOTE CHANGE (812 F3)	SUPERSCRIPT - NOTE (818 F3)	SUBSCRIPT - NOTE (818 F4)	SUPER/SUBSCRIPT - NOTE (812 F5)	NOTE - MULTI STACK LEFT JUST (812 F6)
NOTE-MULTI STACK LEFT JUST (812 F7)	NOTE-MULTI STACK RIGHT JUST (812 F8)	NOTE - SIMPLE FRACTION (818 F406)	NOTE - DUAL STACK FRACTION (818 F401)	NOTE - FONT/DOUBLE FRACTION (818 F405)	NOTE - SUPER/SUB FRACTION (818 F405)	SECTIONED AREA ENTITY (830)	CHARACTER SPACING (468 F48)
SCRIPTORS - "PEPPERS"	RECTANGULAR ARRAY	3 X CIRCULAR ARRAY					CADS TEST NETWORK MIL-D-28000 CLASS 1 REFERENCE DRAWING I-IDENTITY

9.1.10 Output Cadleaf - Detail

IMbedDED	S ^{SUPER}	S _{SUB}	
IMBEDDED FONT -NOTE CHANGE (212 F2)	SUPERSCRIPT-NOTE (212 F3)	SUBSCRIPT-NOTE (212 F4)	S
DUAL $\frac{TO}{P}$ STACK $\frac{BOT}{TOM}$	IM $\frac{BED}{DED}$ i FR $\frac{ACT}{ION}$	T $\frac{O}{P}$ FR $\frac{SUP}{SUB}$ BO $\frac{TT}{OM}$	
NOTE- DUAL STACK FRACTION (212 F101)	NOTE - FONT/DOUBLE FRACTION (212 F102)	NOTE - SUPER/SUB FRACTION (212 F105)	SI

9.1.11 Output IGESView

CIRCULAR ARC (100)	COMPOSITE CURVE (102)	CONIC ARC (GENERAL) (104 F0)	CONIC ARC ELLIPSE (104 F1)	CONIC ARC HYPERBOLA (104 F2)	CONIC ARC PARABOLA (104 F3)	LINEAR PLANAR CURVE (106 F11)	SIMPLE CLOSED AREA (106 F63)
LINE (110)	PARAMETRIC SPLINE CURVE (112)	TRANSFORMATION MATRIX (124 F0)	RATIONAL B-SPLINE CURVE (126 F0)	RATIONAL B-SPLINE CURVE (126 F1)	RATIONAL B-SPLINE CURVE CIRCULAR ARC (126 F2)	RATIONAL B-SPLINE CURVE ELLIPTICAL ARC (126 F3)	RATIONAL B-SPLINE CU PARABOLIC ARC (126 F4)
RATIONAL B-SPLINE CURVE HYPERBOLIC ARC (126 F5)	GENERAL NOTE (212 F0)	DUAL STACK - NOTE (212 F1)	EMBEDDED FONT - NOTE CHANGE (212 F2)	SUPERSCRIPT - NOTE (212 F3)	SUBSCRIPT - NOTE (212 F4)	SUPER/SUB SCRIPT - NOTE (212 F5)	NOTE - MULTI STACK LEFT (212 F6)
NOTE - MULTI STACK CENT JUST (212 F7)	NOTE - MULTI STACK RIGHT JUST (212 F8)	NOTE - SIMPLE FRACTION (212 F100)	NOTE - DUAL STACK FRACTION (212 F101)	NOTE - FONT/DOUBLE FRACTION (212 F102)	NOTE - SUPER/SUB FRACTION (212 F105)	SECTIONED AREA ENTITY (230)	CHARACTER SPACING (406 F16)
							<p>CALS TEST NETWORK ML-D-28000 CLASS 1 REFERENCE DRAWN I-ENTITY</p>

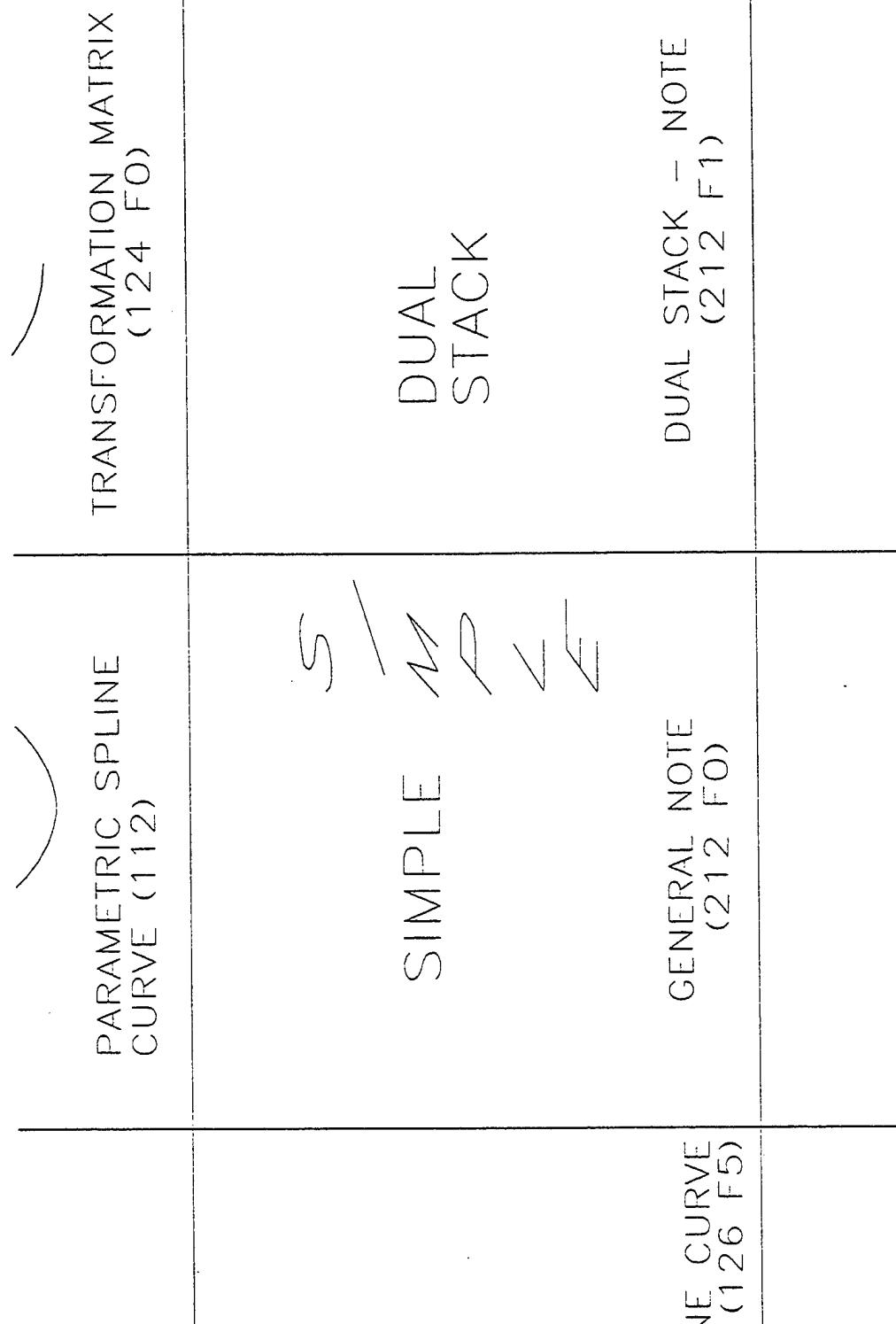
CIRCULAR ARC CLOSED	OPPOSITE ACUTE CLOSED	CLOSED ARC CLOSED	CLOSED ARC OPEN	CLOSED ARC OPEN	CLOSED ARC OPEN	CLOSED ARC OPEN
LINN CIRCLE	PARABOLIC ARC OPEN	TRANSVERSE ELLIPTICAL MALTESE CROSS	INVERTED PARABOLIC CURVE	INVERTED PARABOLIC CURVE	INVERTED PARABOLIC CURVE	INVERTED PARABOLIC CURVE
SIMPLE BENT	SIMPLE BENT	DUAL STACK	INVERTED DUAL STACK	INVERTED DUAL STACK	INVERTED DUAL STACK	INVERTED DUAL STACK
H STACK CENTER	H STACK RIGHT	H STACK LEFT	INVERTED H STACK LEFT	INVERTED H STACK RIGHT	INVERTED H STACK LEFT	INVERTED H STACK RIGHT
NOTE: H STACK SENT SENT CHARS	NOTE: H STACK SENT SENT CHARS	NOTE: H STACK SENT SENT CHARS	NOTE: H STACK SENT SENT CHARS	NOTE: H STACK SENT SENT CHARS	NOTE: H STACK SENT SENT CHARS	NOTE: H STACK SENT SENT CHARS
REGISTRATION MARKS	REGISTRATION MARKS	REGISTRATION MARKS	REGISTRATION MARKS	REGISTRATION MARKS	REGISTRATION MARKS	REGISTRATION MARKS

9.1.12 Output IGEWorks

9.1.13 Output IslandDraw

 CIRCULAR ARC (1100)	 COMPOSITE CURVE (1102)	 CONIC ARC (GENERAL) (1104 f01)	 CONIC ARC ELLIPSE (1104 f11)	 CONIC ARC PARABOLA (1104 f33)	 LINEAR PLANAR CURVE (1106 f11)	 SIMPLE CLOSED AREA (1106 f63)
 LINE (1105)	 PARAMETRIC SPLINE CURVE (1112)	 TRANSFORMATION MATRIX (1124 f01)	 RATIONAL B-SPLINE CURVE (1126 f01)	 RATIONAL B-SPLINE CURVE (1126 f11)	 RATIONAL B-SPLINE CURVE (1126 f21)	 RATIONAL B-SPLINE CURVE (1126 f31)
 RATIONAL B-SPLINE IMBEDDED FONTS (1126 f51)	 SIMPLE STACK (1124 f01)	 DUAL STACK (1124 f01)	 IM DIVDED (1124 f01)	 SUPER SUB (1124 f01)	 SUBSCRIPT-NOTE (1124 f01)	 SUPER/SUB SCRIPT-NOTE (1124 f01)
 M STACK CENTER (1124 f01)	 M STACK RIGHT (1124 f01)	 S FRACTION (1124 f01)	 DUAL TO P (1124 f01)	 IM BEDD (1124 f01)	 FR ACT/ION (1124 f01)	 SUPER SUB (1124 f01)
 NOTE-MULTI STACK CENTER JUST (1124 f01)	 NOTE-MULTI STACK RIGHT (1124 f01)	 NOTE-SIMPLE FRACTION (1124 f100)	 NOTE-DUAL STACK FRACTION (1124 f100)	 NOTE-FONT/DDOUBLE FRACTION (1124 f102)	 SECTIONED AREA ENTITY (1124 f103)	 CHARACTER SPACING (1124 f103)
 SUBFIGURE- "PERSON"	 RECTANGULAR ARRAY	 3 X CIRCULAR ARRAY				 CALL TEST NETWORK MIL-21000 CLASS 1 REFERENCE DRAWING 1-ENTITY

9.1.14 Output Generic



9.1.15 Output Generic - Detail